Pacbaroness History

Northeast of the Channel Islands National Marine Sanctuary boundary lie the shipwreck remains of the bulk-carrier *Pacbaroness* that foundered after a collision with the car-carrier *Atlantic Wing* in 1987 (Schwemmer 2002). Although the shipwreck lies outside the sanctuary boundary and at present is not considered an historic resource, there is a concern that the toxic cargo and fuel oils could pose a threat to sanctuary marine resources. The *Pacbaroness* sank in over 1,400 feet (426 meters) of water with a cargo of 21,000 metric tons of finely powdered copper concentrate. The vessel was also carrying 339,360 gallons of fuel oil and 10,015 gallons of lubricating oil. Initial investigations indicated that approximately 20,000 gallons of oil spilled from the wreckage, and that some copper concentrate escaped into the water from breached cargo holds (Hyland 1988).

Pacbaroness Reconnaissance

During NOAA's Sanctuary Quest: West Coast Expedition 2002, a multidisciplinary team of scientists conducted reconnaissance dives to the shipwreck *Pacbaroness* utilizing the U. S. Navy's ROV *Maxrover* tethered to the Navy's research vessel M/V *Independence*. The goals of the expedition were to determine the present condition of the shipwreck and to collect sediment samples of the surrounding area for analysis. The expedition was made possible through a cooperative partnership with the Naval Facilities Engineering Service Center at Port Hueneme, California. The science team included researchers from Channel Islands National Marine Sanctuary, National Marine Sanctuary Program Office, NOAA's HAZMAT division, National Ocean Service Special Projects Office and University of California Santa Barbara - Marine Science Institute.

The research vessel *Independence* arrived off Point Conception on July 9, 2002 with surface visibility less than a quarter mile due to fog, similar to conditions when the bulk-carrier *Pacbaroness* collided with the car-carrier *Atlantic Wing* fifteen years earlier. After reviewing the 1987 side scan results it was determined the shipwreck was positioned on the ocean floor in a north-south lengthwise direction. Transits were run east to west in order to detect an elongated target. Utilizing an Odom Echotrac Fathometer, a target was located on the ocean floor in the depth range of 1410-1460 feet (430-445 meters). After completing 10 transits it was determined that the submerged structure on the ocean floor was close to the overall length of the 562-foot (171 meters) *Pacbaroness*.

The ROV *Maxrover* was launched from the research vessel *Independence*. Upon arriving on the ocean floor the sonar equipped ROV revealed an image of a large structure dead ahead. The sonar also rendered images of cable hazards draped from the ship's structure disappearing into the sediment. The *Maxrover* was carefully

maneuvered around the cables as the powerful lights illuminated the steel hull of the *Pacbaroness*' stern. The ship's rudder was partially buried in the sediment and there was no sign of the large propeller, which was now completely buried. It was confirmed that the stern section had separated from the remainder of the ship, breaking at the collision point. The ROV cameras also revealed that the *Pacbaroness* was not a "dead zone" as some suspected, but supported a diverse marine life community. During the first dive near the ocean floor observations included sablefish, Dover sole, Thorny-head rockfish, Blackgill, urchins, nudibranchs, and Brittle stars. At the completion of the first ROV dive, the science team mobilized equipment for the twelve-hour night shift. Utilizing a Van Veen sampler, the team collected sediment samples around the *Pacbaroness* shipwreck and a nearby control site in an attempt to replicate the position coordinates of the 1988 sediment collection effort.

The following day a 10-hour ROV circumnavigation of the site confirmed the *Pacbaroness* is in three separate sections. The stern is separated most likely at the collision impact zone in the No. 5 cargo hold and is angled away from the main wreckage. Because of the 40-degree downward angle of the stern section into the ocean floor, what appeared on the side scan image to be an elongated structure protruding beyond the stern was recorded to be the rudder (see Figure 3). The bow is also headed in a slightly different direction from the midships section of the shipwreck where the cargo holds are located. During the exploration near the No. 3 & 4 cargo holds it was discovered that the height from the main deck level of the shipwreck to the ocean floor sediment was actually the same level. Had the shipwreck been sitting upright on its keel with no sediment buildup, it would be approximately 45-feet (13 meters) from the main deck to the ocean floor. The main deck location was confirmed during this phase of the assessment by locating one of the starboard stanchions located in its original outward position on the main deck. This discovery revealed that bottom sediment has been building up around the shipwreck site and possibly encapsulating the spilled cargo near the vessel. An attempt to penetrate the shipwreck's interior to verify if the steel folding cargo covers were breached after sinking was aborted since further visual and sonar inspection revealed cable hazards preventing safe navigation for the *Maxrover* (see Figure 3).

The ROV moved into position to inspect the portside bow, the lights revealed that the painted letters of the ship's name curved inward into the steel hull. It was apparent the bow had suffered severe damage when impacting the ocean floor, causing rippling damage "like an accordion." The final goal was to return to the stern transom and record the hull surface where the ship's name was painted. Videography and still photographs documented the current levels of marine growth covering the letters were compared to the images recorded in 1988 of the same region when the transom was clean of marine growth (see Figure 3). With the exception of penetrating the cargo hold region, the expedition was successful, providing the Sanctuary Quest science team with some answers to the long awaited question of

whether life exists at the shipwreck *Pacbaroness*. Upon recovery of the *Maxrover,* sediment sample collection continued through out the next twelve hours.

The samples were sent to a Seattle lab to be analyzed for copper and polynuclear aromatic hydrocarbons (PAHs). Samples collected around the *Pacbaroness* and a nearby control site are also being evaluated to investigate potential impacts on macroinfauna. Results of the sediment testing are expected in 2003.

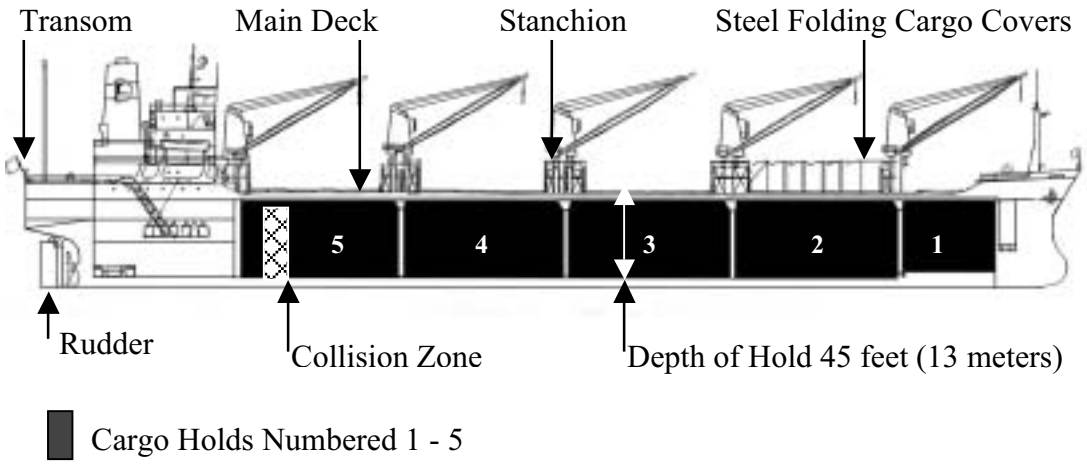

Figure 3
Bulk carrier *Pacbaroness* illustrating collision impact zone and cargo arrangement.

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